Author/Presenter's Name: Edward Korczak
Affiliation: Telecommunications Research institute, Warsaw, Poland
Title: **Binary representations of multistate monotone systems**

Abstract

Block and Savits introduced in 1982 a binary decomposition of multistate monotone systems (MMS) that allows MMS to be analysed using combinatorial methods known from the binary system theory. Namely, the reliability analysis of an MMS is decomposed into analyses of a number of binary systems with simpler structure than that of the original MMS.

In this paper a new definition of a binary representation of a multistate monotone structure function is formulated and its main properties are obtained. The definition is given in terms of conditions to be satisfied, whereas the definition proposed by Block and Savits is given by a closed-form formula. Several forms of binary representations are discussed and illustrated by simple examples, e.g. sum of disjoint products form. Furthermore, two different types of factoring (pivotal decomposition) of the binary representation are introduced and its use in simplification of the corresponding binary structures is illustrated. The reverse question is also considered: when a given sequence of binary structures (for example, depicted by the corresponding reliability block diagrams) forms a binary representation of an MMS?

Finally, the application of binary representation to calculation of the reliability indices of an MMS is illustrated by examples.

Category: Contributed Speaker
Equipment needed: Overhead
Email address: korczak@pit.edu.pl (office), ekorczak@acn.waw.pl (home)
URL (organization): www.pit.edu.pl
Telephone: (48 22) 810-00-51 ext. 204
FAX: (48 22) 810-23-80